

A Comprehensive Nonpoint Source Field Study for Sediment, Nutrients and Pathogens in the South Fork of the Broad River Watershed in Northeast Georgia

A Cooperative Research Project Between EPA ORD and EPA Region 4

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PURPOSE OF PROJECT

There is an urgent need for EPA to develop protocols for establishing Total Maximum Daily Loads (TMDLs) in streams, lakes and estuaries. A cooperative TMDL field data collection project between the Office of Research and Development (ORD) and Region 4 is ongoing in the South Fork of the Broad River Watershed (SFBR). This watershed is approximately 245 square miles with just over 337 stream miles and is located in the Savannah River Basin of Northeast Georgia. It is in this area that we conduct intensive rain event stream sampling.

In 1998, the State of Georgia listed the SFBR watershed as biologically impaired. However, the source of contamination was unknown. This project is developing sampling methods and standards to measure the TMDL of bedload and suspended sediment, nitrogen, phosphorus, organic carbon and pathogenic microorganisms. A comprehensive database is being developed to field test and apply mathematical models and approaches for calculating the TMDLs in this watershed and its tributaries in a field setting not available elsewhere in the U.S.

Six stream sites have been fitted with innovative monitoring equipment for collecting data before, during, and after rain events. A weather station located in the watershed is used for collecting meteorological data. Additional data are being collected from seven other study sites with state-of-the-art rain gauges. Stream hydrographic data are being collected for stage and velocity to develop stage-discharge relationships for each sampling site which includes a continuous real-time gauging station at the watershed outlet. When the study is complete, over three hundred stream cross-sectional sites will be surveyed and samples analyzed and characterized in relation to particle size and carbon content.

Savannah River Basin

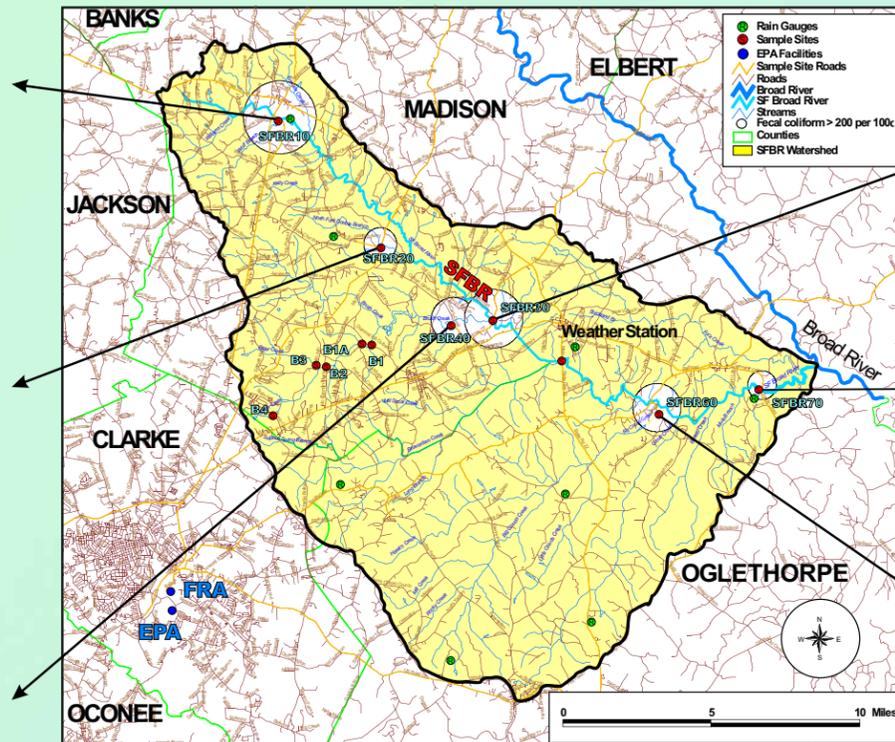


- Southeast cities
- South Fork Broad River Watershed
- Savannah River Basin
- Southeast United States

Field Research Laboratory



South Fork Broad River Watershed Study Area

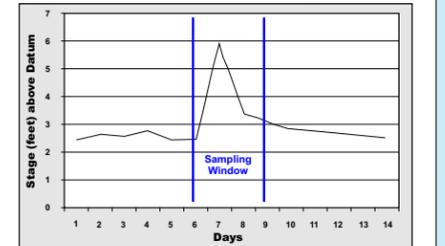


IMPACTS OF FIELD RESEARCH

Prior to the SFBR project, there was limited scientific data available to support TMDL development. The results of the SFBR project will accomplish the following:

1. Provide a comprehensive dataset that allows for development, field testing, and calibration of mathematical models addressing water quality and quantity in a watershed. The dataset created in SFBR will be unique; there is no other study site with a comparable collection of data in the U.S.
2. Provide robust data and models that establish a scientific basis for clean sediment and pollutant TMDLs.
3. Provide a means of testing field and laboratory instrumentation, methodology, and development of standard operating procedures for sampling protocols, sample processing and analytical analyses.
4. Develop procedures for site selection, field instrumentation, maintenance and servicing, frequency of sampling, data requirements, safety and QA.

Typical Rise in Stream Level During Rain Event



Pollutant Loads During a Low Flow Rain Event

Site	Total Suspended Sediment (pounds)	Ammonia Nitrogen (pounds)	Nitrate Nitrogen (pounds)	Ortho Phosphorus (pounds)	Total Phosphorus (pounds)	Total Organic Carbon (pounds)
SFBR10	4805.4	4.3	43.2	3.5	5.3	370.4
SFBR20	431.8	1.5	4.3	0.6	0.8	43.6
SFBR30	5270.3	30.9	386.7	18.5	20.0	3511.3
SFBR40	4942.9	11.0	12.0	8.5	9.4	1057.5
SFBR60	75503.5	17.6	261.1	14.2	40.0	2473.1

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Meteorological Measurements

Rain Gauge



Weather Station



Mobile Laboratory



Onsite Field Analysis



Low Flow Conditions



High Flow Conditions



YSI Multi-Probe



Rain Event Sampling



Rain Event Sampling



Rain Event Sampling



Rain Event Sampling



Rain Event Sampling



Rain Event Sampling



Rain Event Sampling

